

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

POND SEALING OR LINING

SOIL CEMENT

(No.)

CODE 521G CA INTERIM

DEFINITION

Installing a fixed lining of impervious material and treating the soil in a pond mechanically to impede or prevent excessive water loss.

Scope

This standard pertains to the sealing of ponds with soil cement.

PURPOSES

To reduce seepage losses in ponds to an acceptable level.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where water loss from a pond through leakage is or will be of such proportion as to prevent the pond from fulfilling its planned purpose or where leakage will damage land and crops or cause waste of water or environmental problems.

CRITERIA

Ponds to be sealed shall be constructed to meet NRCS standards for irrigation pits (552A) or regulating reservoirs (552B), irrigation storage reservoirs (436), ponds (378), waste treatment lagoons (359), waste storage facility (313), or wildlife watering facilities (648), as appropriate.

Soil Properties

Sealing with soil-cement is applicable on coarse-grained soils. The ideal soil material should contain about 35 percent passing the No. 200 sieve size, and less than 0.5 percent of organic matter. The soil should not contain gravel larger than 2 inches nor more than 45 percent sand or gravel larger than 1/4 inch.

Since soils at project site may not necessarily be suitable, soils from a borrow area within an economical haul distance should be investigated.

Rate of Application

The rate of application shall be based on laboratory tests unless sufficient data are available on the field performance or previously tested soils that are similar in texture and chemical properties to the soils to be sealed.

The design cement factor shall be determined from either wet-dry or freeze-thaw test. The allowable weight loss for test specimens are as given under "Laboratory Data".

In the absence of laboratory tests or field performance data on the soils to be sealed, the minimum application for estimating purposes shall be 10 percent cement by volume.

Thickness of Treated Blanket

The minimum thickness of the finished treated blanket shall be 4 inches for water depths up to 8 feet. Additional thickness shall be provided for greater water depths.

Subgrade

To reduce damage to the lining by vegetation, the subgrade shall be treated with a soil sterilant prior to the placement of soil-cement.

Area to be Treated

The total wetted area shall be treated and treatment shall be provided to an elevation that will protect the sides against wave action.

Laboratory Data and Report

A 200 pound sample of the on-site material shall be collected and submitted to a soil mechanics laboratory for testing. The following tests are to be performed, and a design mix determined that will yield the following results with the minimum cement content:

Test	Result
Compressive Strength	greater than 750 psi
Wet-Dry Test (loss of weight)	less than 10 percent
Freeze-Thaw Test (percent loss of weight)	less than 10 percent
Permeability	less than 1 foot/yr

The laboratory shall prepare a report that contains the original worksheets and results of all tests performed.

The laboratory report shall also contain the test data for:

- Moisture-Density Relationship of soil material without cement.
- Moisture-Density Relationship of soil material with the percentage of cement that is determined to be the design-mix.

CONSIDERATIONS

Water Quantity

- Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
- Variability of the practice's effects caused by seasonal or climatic changes.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on the volume of downstream flow to prohibit undesirable environmental, social, or economic effects.

- Potential use for water management to conserve water.

Water Quality

- Effects on the movement of sediment, pathogens, and soluble substances carried by seepage toward the ground water.
- Effects on the visual quality of the downstream water resources.
- Short-term and construction-related effects of this practice on quality of the local and downstream water resources.
- Effects on the movement of dissolved substances below the pool area and toward ground water.
- Effects on wetlands or water-related wildlife habitats.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

PLANS AND SPECIFICATIONS

Plans and specifications for sealing ponds with soil cement shall be in keeping with this standard and shall

describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan must be prepared by the Designer for use by the owner or other responsible for operating this practice. The plan should provide specific instructions for operating and maintaining the system to insure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damage components.